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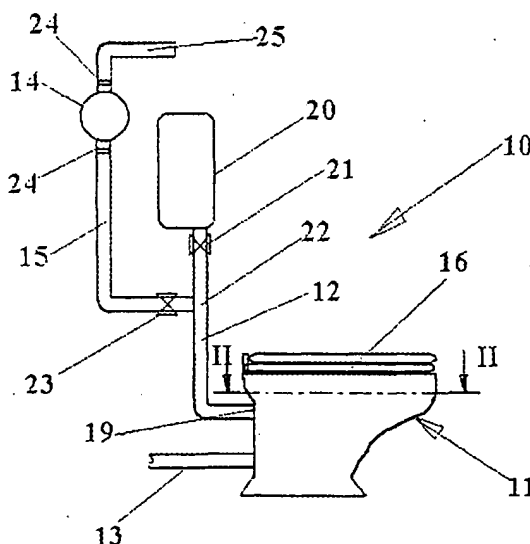
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(54) Title: **AIR SUCTION DEVICE FOR ROOMS APT TO CONTAIN TOILETS OR THE LIKE**



(57) Abstract: An air suction device (10) for rooms apt to contain toilets or the like comprises: a bowl (11) for collecting faeces and waste, usually having at least one flush groove (17) for inletting flushing water, said bowl (11) being provided with at least one supply piping (12) for the hydraulic connection to a delivery tank (20) of said flushing clean water, a plurality of holes (18) for distributing said white water inside of the bowl (11), and at least one sewage waste piping (13) for entraining said faeces and waste. Said device further comprises at least one operating machine (14) and at least one suction duct (15) apt to connect said operating machine (14) to a set of suction holes provided in the body of said bowl (11).

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AIR SUCTION DEVICE FOR ROOMS APT TO CONTAIN TOILETS OR
THE LIKE

FIELD OF THE INVENTION

5 The present invention concerns an air suction device
for rooms apt to contain toilets or the like, and, more
particularly, it relates to a device made of components
capable of sucking air saturated with unpleasant smells
in toilets, and in particular where a spontaneous
aeration be unattainable.

10 STATE OF THE ART

WC usage is well-known to cause at times the ambient
diffusion of unpleasant smells, persisting when the
toilet does not have vents ensuring an air interchange.

15 To date suction fans are employed, possibly provided
with filters. They are positionable close to the top wall
of the room to be aerated and seldom connected to a
circuit for the venting of the stale air.

20 The actuation of such fans may be carried out with a
manual control or automatically, e.g., upon switching off
the switch of the electrical lighting circuit or upon
operation of the WC flush.

25 The persistence of stale smells in rooms apt to
contain toilets or the like is particularly noticeable in
buildings located in the vicinities of the seaside; in
fact, the tidal effect and the sudden changes in
atmospheric pressure determine pressure gradients which
cause the propagation of foul-smelling air in a number of
toilets of a same building.

30 This propagation of foul smells occurs via the waste
piping, which in these cases belong to an individual
hydraulic circuit. Under these conditions, the suction
fans are not capable of ensuring any minimum stale air
disposal.

DESCRIPTION OF THE INVENTION

35 The object of the present invention is to provide an
air suction device for rooms apt to contain toilets or
the like which be capable of eliminating or significantly

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reducing the abovereported drawbacks.

A further object of the present invention is to provide a suction device applicable to any commercially available sanitary service.

5 Another further object of the present invention is to provide a suction device of easy implementation and installation, which may be manufactured and connected at competitive costs.

10 This is attained by means of an air suction device for rooms apt to contain toilets or the like characterised as set forth in the main claim.

The dependant claims outline advantageous embodiments of the invention.

15 The air suction device for rooms apt to contain toilets or the like according to the invention comprises:

- a bowl for collecting faeces and waste, usually having at least one flush groove for inletting flushing water, such bowl being provided with at least one supply piping, in charge of the hydraulic connection to a delivery tank of said flushing clean water, and with at least one effluent waste piping for entraining said faeces and waste,

20 - at least one suction pump,
- at least one suction duct apt to connect the suction pump to the supply piping.

25 According to the invention, the suction pump has a delivery duct communicating with the outside of the room containing toilets or the like.

30 The suction duct has a valve means for preventing the rise of liquid from said supply piping towards an operating machine.

The supply piping is directly connected to the flush grooves of the flushing water, which when at rest do not have liquid at the inside thereof, the delivery tank being provided with a suitable valve means destined to open solely during the flushing step.

The suction pump determines a negative pressure

inside of the suction duct, which thus sucks the stale air stagnating inside of the bowl, forcing the former to flow through the diffusion grooves and then reascend from the supply piping.

5 Thus, possible stale air, saturated with foul smells exhaled from the faeces and waste inside of the bowl, is effectively sucked by the pump and eventually delivered outwards by means of the delivery duct.

10 The actuation of the pump may be controlled by a toilet user, or it may take place automatically, upon occurrence of certain conditions.

According to another embodiment, the bowl comprises a set of suction holes connected to a suitable pump.

15 In this case, the suction takes place via said holes, which are separated with respect to those provided for the flowing of the bowl flushing water.

EXPLANATION OF THE DRAWINGS

20 Other features and advantages of the invention will be apparent from a reading of the following description of an embodiment of the invention, given by way of example and not for limitative purposes, with the aid of the drawings illustrated in the attached table, wherein:

- Fig. 1 is a partially sectional side elevational view of a suction device according to the invention;
- 25 - Fig. 2 is a sectional view taken along the chain II-II of Fig. 1;
- Fig. 3 depicts a block diagram illustrating the operation of the device of Fig. 1;
- Fig. 4 is a view analogous to Fig. 1 according to a different embodiment; and
- 30 - Fig. 5 shows a block diagram illustrating the operation of the device of Fig. 4.

DESCRIPTION OF AN EMBODIMENT

35 With initial reference to Figs. 1 and 2, the reference number 10 generally indicates an air suction device for rooms apt to contain toilets or the like, specifically a device 10 comprising:

- a bowl 11 for collecting faeces and waste provided with at least one supply piping 12 and with at least one sewage waste piping for entraining said faeces and waste.
- a suction pump 14, receiving power from any suitable source, e.g., a power grid,
- at least one suction duct 15 apt to connect the pump 14 to the supply piping 12.

At the top end of the basin 16 thereof, the bowl 11 has at least one inner perimetral groove 17 provided with a plurality of holes 18 for communicating with the former.

The pitch of the holes 18 is uneven, said holes being arranged in a wider spacing thereamong proportionally to the distance thereof from the inlet 19 connecting the bowl 11 to the supply piping 12.

The groove 17 diffuses the flushing water, supplied from the piping 12, and inlets the former onto the basin 16 via the holes 18.

The flushing water is inletted from a delivery tank 20 hydraulically connected to the bowl 11 by means of the supply piping 12.

Near to the tank 20, the piping 12 has a valve member 21, which allows the flushing white water to flow during the flushing step of the basin 16 of the bowl 11 while preventing the passage thereof in any other case, normally leaving the piping 12 and the groove 17 empty.

The suction duct 15 is connected to the supply piping 12 by means of a respective connector 22 located between the inlet 19 and the valve member 21.

Moreover, such duct 15 may have a valve member 23 apt to prevent a possible liquid rise, remaining in an opened position during an operation of the pump 14, and in a closed position during the step of flushing the bowl 11.

Near to the operating machine 14, the duct 15 may be provided with a filter 24 for preventing impurities from being intaken by the former, possibly impairing the

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operation thereof.

The pump 14 may have a delivery duct 25 communicating with the outside of the room containing the toilet or the like.

5 In this case, a reversible operating machine capable of sucking air from the outside via the duct 25 and delivering it, via the duct 15 and the piping 12, towards the bowl 11, may be provided.

10 This operation is linked to the fact of using a filter 24 saturated with perfuming substances like aromatic gels or fluids, in order to emanate pleasant and refreshing scents in the room containing the toilet or the like.

15 Always under such conditions, the duct 25 may have, near the operating machine 14, a further filter 24 (not shown in the Figs.) for retaining possible outside impurities.

20 With reference to Fig. 3, according to the block diagram shown therein, the step of flushing the bowl 11 provides the outletting of the flushing clean water from the tank 20, according the senses and directions of the arrows denominated with 'A', the subsequent outletting of sewage according the senses and directions of the arrows denominated with 'B'.

25 The subsequent step of sucking foul smells stagnating in the bowl 11 provides the actuation of the operating machine 14, which sucks in the stale air according the senses and directions of the arrows denominated with 'C', and possibly delivers the latter
30 outwards, directionwise and sensewise of the arrow denominated with 'D'.

As it is apparent from Figs. 4 and 5, according to a variant embodiment, in case the operating machine may not be put in communication with the outside, the intaken
35 fouled air is conveyed from the operating machine 14 towards the waste piping 13.

In any case, the actuation of the operating machine

or pump 14 may be controlled by a toilet user by means of an easily accessible and visible switch, positionable, e.g., near the flushing button. Alternatively, the machine 14 may automatically be actuated under certain conditions, like, e.g., the making of the electric lighting circuit.

The invention has hereto been described with reference to a particularly advantageous embodiment thereof.

10 However, it is apparent that the invention comprises a number of variants, all falling within the scope thereof.

15 By way of example, according to a further embodiment, the collecting bowl is provided with a second set of holes, in turn connected, by means of a suitable manifold, to a suction pump.

In this case, the suction of the air from the bowl is carried out via holes divided with respect to those for the passage of the flushing water.

20 Hence, the expulsion of the air sucked in by the pump is carried out according to modes analogous to the ones hereto disclosed and illustrated.

CLAIMS

1. An air suction device (10) for rooms apt to contain toilets or the like according to the invention, comprising:
- 5 - a bowl for collecting faeces and waste, usually having at least one flush groove (17) for inletting flushing water, such bowl (11) being provided with at least one supply piping (12), in charge of the hydraulic connection to a delivery tank (20) of said flushing
- 10 water, a plurality of holes (18) for distributing said white water inside of the bowl (11), and at least one effluent waste piping (13) for entraining said faeces and waste,
- characterised in that it comprises:
- 15 - at least one operating machine (14),
- at least one suction duct (15) apt to connect said operating machine (14) to a set of suction holes provided in the body of said bowl (11).
2. The device according to claim 1, characterised in
- 20 that said suction holes are the holes (18) for distributing the white water inside of the bowl.
3. The device (10) according to claim 2, characterised in that said suction duct (15) has a valve means for preventing rise of liquid from said supply piping (12)
- 25 towards said operating machine (14).
4. The device (10) according to the preceding claims, characterised in that said duct (15) has a filter (24) near said operating machine (14).
5. The device (10) according to the preceding claims,
- 30 characterised in that said operating machine (14) is electrically connected to an electric switch.
6. The device (10) according to claim 5, characterised in that said electric switch is connected to respective sensors, and is actuated under certain conditions
- 35 detectable from said sensors.
7. The device (10) according to the preceding claims, characterised in that said operating machine (14) has a

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delivery duct (25) communicating with the outside of the room containing said toilets or the like.

8. The device (10) according to the preceding claims, characterised in that said operating machine is
5 reversible, being capable of sucking air from said suction duct (15) as well as from said delivery duct (25).

9. The device (10) according to any one of the claims 7 to 9, characterised in that said filter (24) is saturated
10 with perfuming substances.

10. The device (10) according to any one of the claims 7 to 10, characterised in that said delivery duct (25) has a filter (24) for retaining possible outside impurities.

11. The device (10) according to any one of the claims 1
15 to 6, characterised in that said operating machine has a delivery duct (25) connected to said waste piping (13).

12. The device (10) according to any one of the preceding claims, characterised in that the suction of air is carried out via said holes (18) for distributing
20 the white water inside of the bowl.

13. The bowl (11) for collecting faeces and waste, having at least one flush groove (17) for inletting flushing water, said bowl (11) being provided with at least one supply piping (12) for the hydraulic connection
25 to a delivery tank (20) of said flushing water, a plurality of holes (18) for distributing said white water inside of the bowl (11), and at least one sewage waste piping (13) for entraining said faeces and waste, characterised in that it comprises a plurality of holes
30 opening into the inside of the vessel and being apt to be connected to a suction pump (14) for scavenging the stale air present inside of the bowl (11).

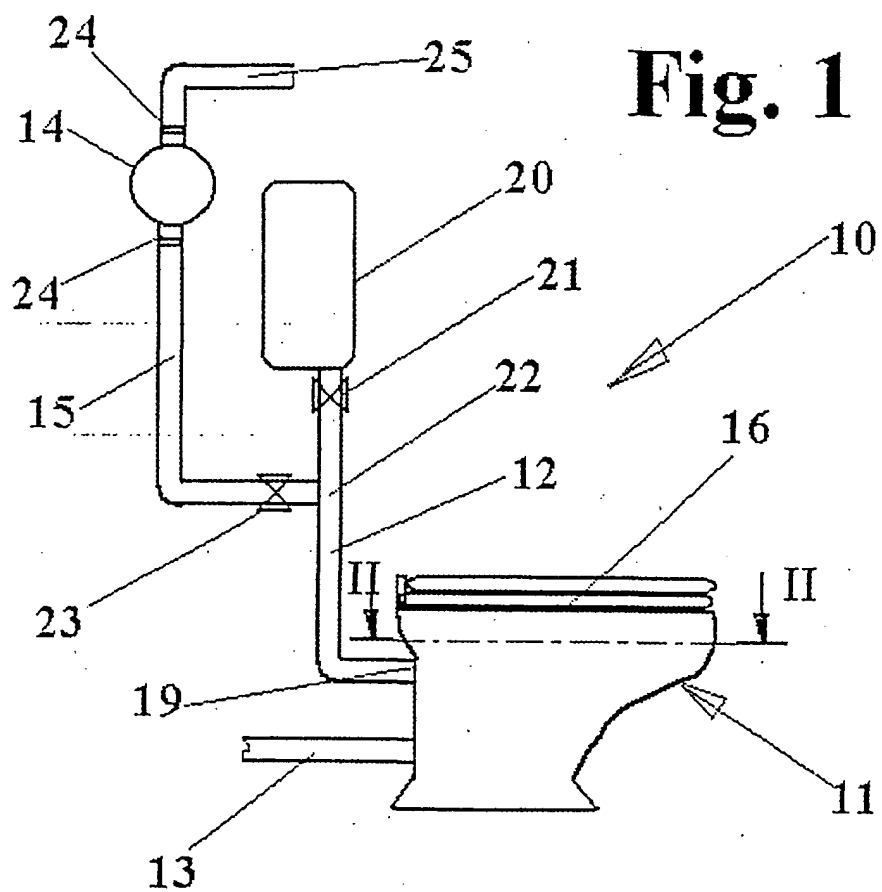
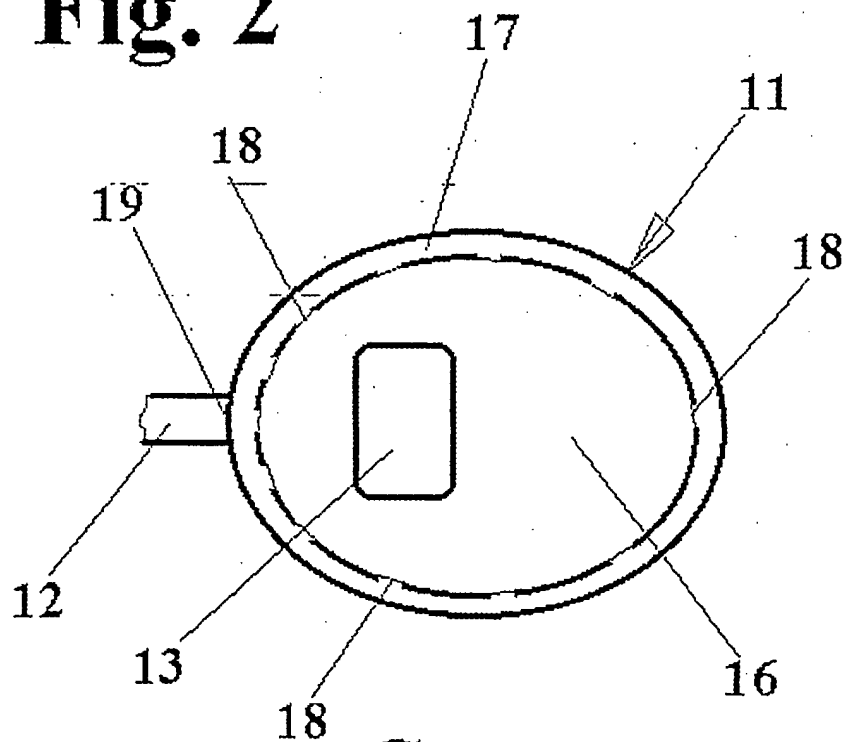


Fig. 2



Sez. II-II

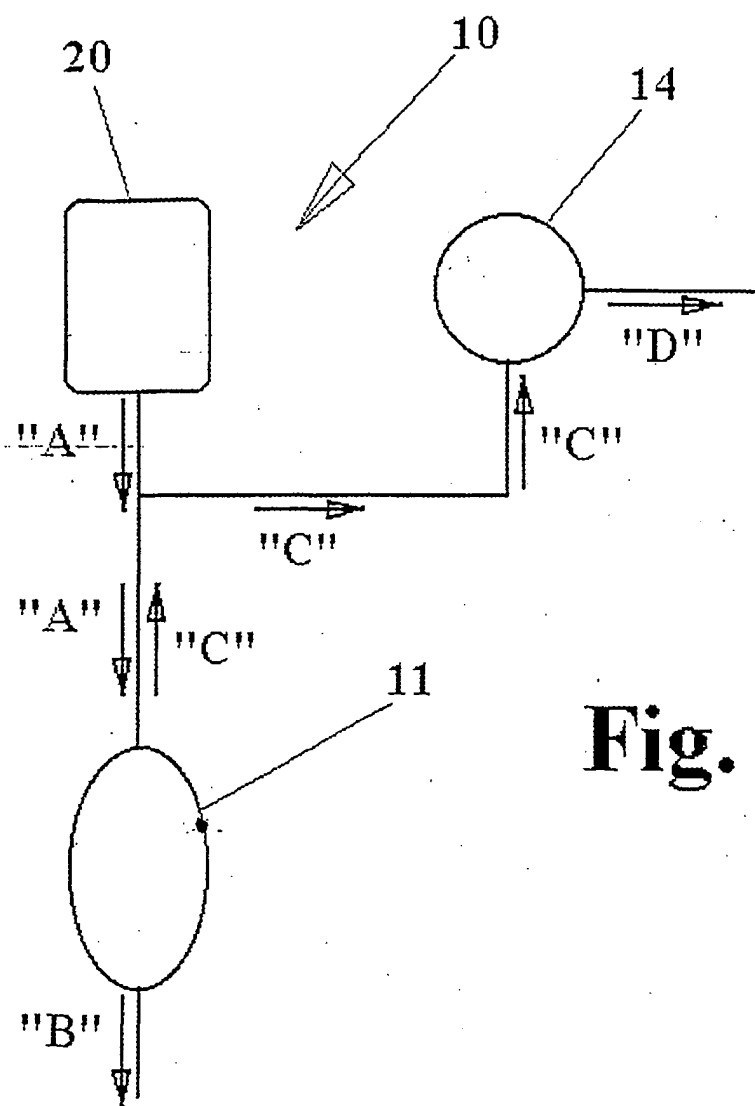
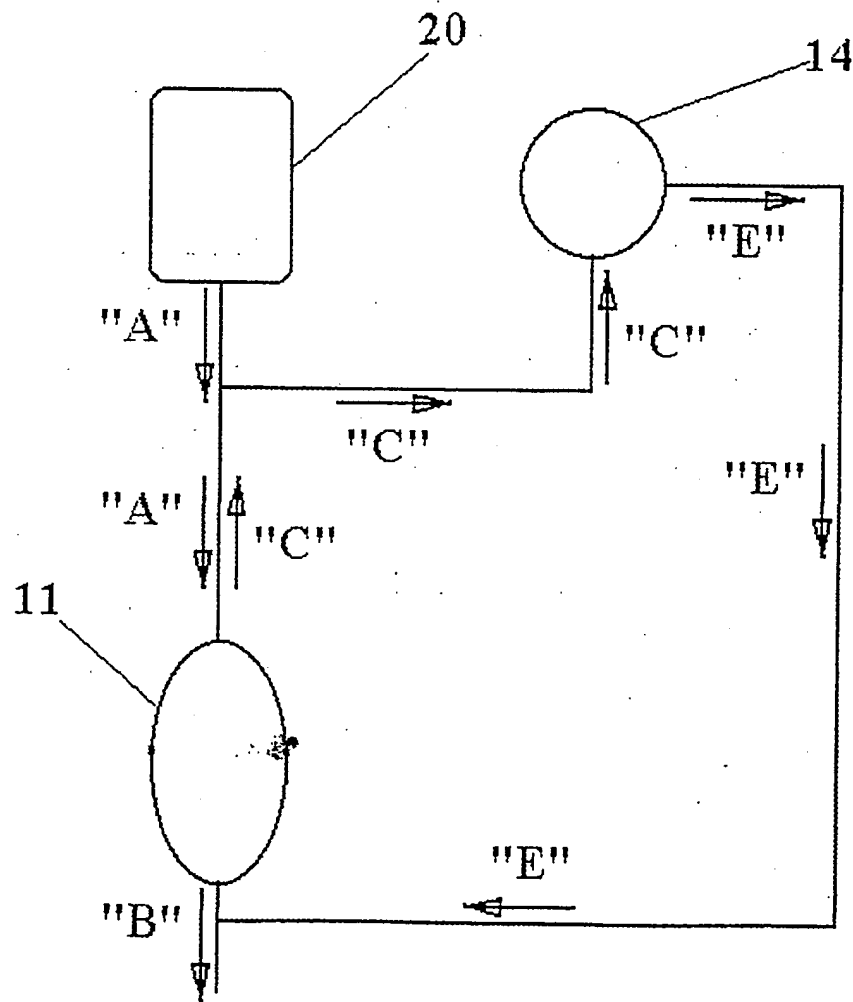
**Fig. 3**

Fig. 5

INTERNATIONAL SEARCH REPORT

Int'l Application No
PCT/IT 01/00215

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E03D9/05

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 E03D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 318 192 A (WILLIAMS JACK D ET AL) 9 March 1982 (1982-03-09)	1-3, 11-13
Y	column 2, line 46 - line 64 column 3, line 47 - column 4, line 37; figures	4-7
Y	US 5 054 130 A (WILSON THOMAS R) 8 October 1991 (1991-10-08)	4-6
A	column 6, line 41 - column 7, line 5 column 7, line 60 - line 68; figures 7,9	9
X	US 3 939 506 A (PEARSON RAYMOND H) 24 February 1976 (1976-02-24)	1,2,13
Y	column 2, line 44 - column 3, line 14 column 3, line 53 - line 59; figures 1,2	7
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

International Application No.

PCT/IT 01/00215

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 715 953 A (RAGOT CLAUDE)	1,2,13
A	11 August 1995 (1995-08-11) page 7, line 7 -page 8, line 34; figures -----	8

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INTERNATIONAL SEARCH REPORT

Int lional Application No

PCT/IT 01/00215

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4318192	A	09-03-1982	NONE	
US 5054130	A	08-10-1991	NONE	
US 3939506	A	24-02-1976	US 3927429 A US 4011608 A	23-12-1975 15-03-1977
FR 2715953	A	11-08-1995	NONE	

Form PCT/ISA/210 (patent family annex) (July 1992)